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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,572	01/30/2004	Susan Swindlehurst	003424.P056X	8400

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EXAMINER

GRAYBILL, DAVID E

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 05/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/769,572	Applicant(s) SWINDLEHURST ET AL.	
	Examiner David E. Graybill	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 and 43-47 is/are pending in the application.
- 4a) Of the above claim(s) 1-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-41 and 43-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3 pages</u> . | 6) <input type="checkbox"/> Other: _____ |

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of claim 57 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim 57 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The undescribed subject matter is the entirety of the claim.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 43 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 43 is incomplete because it depends on canceled claim 42. See MPEP 608.01(n)V.

In the rejections *infra*, generally, reference labels are recited only for the first recitation of identical claim elements.

Claims 25 and 26 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Zafrany (6677186).

At column 2, lines 62-65; and column 3, line 36 to column 5, line 46, Zafrany discloses a method comprising: attaching a first conductor 12 formed on top of a first substrate 1, 2 containing a functional block 10 to a second conductor 6 of a large-scale component 6, the functional block being

embedded in a first substrate 1, 2 and being electrically connected to the first conductor, and the large-scale component being formed on a second substrate 5; the first conductor being attached to the second conductor using one of thermosonic bonding and thermocompression bonding; each of the first conductor and the second conductor being independently made out of any one of a metal, a thermoplastic material, and a thermosetting material; wherein any one of or both of the thermoplastic material and the thermosetting material is inherently conductive.

To further clarify, Zafrany discloses the first conductor formed on top of the first substrate because, as cited, Zafrany discloses the first conductor in contact (at least indirectly) with an outer top surface of the substrate, in close proximity with a top of the substrate, and in a direction or location with respect to a top of the substrate. Further, the disclosure of Zafrany is not limited to an absolute frame of reference or otherwise limited to a particular orientation, and it is inherent that there is a frame of reference wherein the first conductor is in contact (at least indirectly) with an outer top surface of the substrate, in close proximity with a top of the substrate, and in a direction or location with respect to a top of the substrate.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

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matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany as applied to claim 25, and further in combination with Neuhaus (6853087).

Zafrany does not appear to explicitly disclose dispensing a plurality of small and sharp particles into the material used to make one of the first conductor and the second conductor to create a mechanical interlock to enhance the attachment between the first conductor and the second conductor.

Still, at column 11, lines 3-16; column 13, line 9 to column 18, line 17; column 19, lines 6-42; column 20, lines 39-49; column 21, line 9 to

column 23, line 8; column 28, lines 1-21; and column 33, line 66 to column 35, line 49, Neuhaus discloses dispensing a plurality of small and sharp particles 218 into the material used to make one of the first conductor 220 and the second conductor 214 to create a mechanical interlock to enhance the attachment between the first conductor and the second conductor. Furthermore, it would have been obvious to combine this disclosure of Neuhaus with the disclosure of Zafrany because it would enhance the attachment between the first conductor and the second conductor of Zafrany. In addition, both Zafrany and Neuhaus disclose a process of providing a mechanical interlock to enhance attachment between a first and a second conductor, and it has been held that it is obvious to combine two processes for the same purpose. In re Novak 16 USPQ2d 2043. Similarly, "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose [T]he idea of combining them flows logically from their having been individually taught in the prior art." In re Kerkhoven, 626 F.2d 846, 205 USPQ 1069, 1072 (CCPA 1980) (citations omitted) (Claims to a process of preparing a spray - dried detergent by mixing together two conventional spray - dried detergents were held to be prima facie obvious.). See also, In re Crockett, 279 F.2d 274, 126 USPQ 186 (CCPA 1960) (Claims directed to a method and material

for treating cast iron using a mixture comprising calcium carbide and magnesium oxide were held unpatentable over prior art disclosures that the aforementioned components individually promote the formation of a nodular structure in cast iron.); and Ex parte Quadranti 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992) (Mixture of two known herbicides held prima facie obvious). Still further, as disclosed by Neuhaus as cited, it would have been obvious to combine this disclosure of Neuhaus with the disclosure of Zafrany because it would easily penetrate the contact surfaces, provide a very low resistance path between the surfaces, and penetrate any undesirable insulation films between the surfaces.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany as applied to claim 25, and further in combination with Chang (20030232174).

Zafrany does not appear to explicitly disclose dispensing the functional block into the first substrate using fluidic self assembly.

Nevertheless, as cited, Zafrany discloses dispensing the functional block into the first substrate using "any known technique." Furthermore, at column 16, lines 53-65, Chang discloses dispensing the functional block 330 into the first substrate 32 using fluidic self assembly. Therefore, it would have been obvious to combine this disclosure of Chang with the disclosure of

Zafrany because it would facilitate provision of the "known technique" of Zafrany.

Claims 29, 30, 32 35-40 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Zafrany (6677186) and Zandman (20010000631).

As cited supra, Zafrany discloses the following:

A method comprising: attaching a first conductor being made of a material to an integrated circuit 10 embedded in a first substrate, the first conductor electrically connected to the integrated circuit, the first conductor being formed on a top surface of the first substrate; and attaching a large-scale component to the first conductor, the large-scale component electrically connected to the first conductor, and the large-scale component formed on a second substrate; embedding the integrated circuit in the first substrate; wherein attaching the first conductor to the integrated circuit is accomplished by any one of screen printing, flatbed and rotary screen printing, stencil printing, ink jet printing, gravure printing, flexographic printing, pad stamping, electrostatic printing, dispensing through a needle and pipette, laminating, hot pressing, laser assisted chemical vapor deposition, physical vapor deposition, shadow masking, evaporating, extrusion coating, curtain coating, and electroplating.

A method comprising: embedding an integrated circuit into a first substrate and disposing a first conductor on the first substrate, the integrated circuit electrically connected to the first conductor, the first conductor being made of a material; and electrically coupling a large-scale component having a second conductor to the integrated circuit, the second conductor being electrically coupled to the first conductor to electrically couple the large-scale component to the integrated circuit, the large-scale component including a second substrate; wherein any one or both of the thermoplastic material and the thermosetting material is inherently conductive; coupling the second conductor directly to the first conductor wherein an active surface of the integrated circuit faces the second conductor; wherein an active surface of the integrated circuit faces the second conductor; wherein the thermoplastic material has conductive fillers "metallic particles"; wherein the thermosetting material has conductive fillers; wherein the integrated circuit is a circuit suitable for use with radio frequency, display, sensor, or phase array antenna applications; wherein the large-scale component includes an antenna, an electronic display, a display electrode, a sensor, a power source, a memory device, and a logic device formed on that second substrate; wherein the antenna is part of the second conductor.

To further clarify, Zafrany discloses the first conductor being formed on a top surface of the first substrate because, as cited, Zafrany discloses the first conductor in contact (at least indirectly) with an outer top surface of the substrate, in close proximity with a top surface of the substrate, and in a direction or location with respect to a top surface of the substrate. Further, the disclosure of Zafrany is not limited to an absolute frame of reference or otherwise limited to a particular orientation, and it is inherent that there is a frame of reference wherein the first conductor is in contact (at least indirectly) with an outer top surface of the substrate, in close proximity with a top surface of the substrate, and in a direction or location with respect to a top surface of the substrate.

However, Zafrany does not appear to explicitly disclose the first conductor being made of a thermoplastic or a thermosetting material.

Nonetheless, as cited, Zafrany discloses the first conductor being made of a conductive polymer. In addition, at paragraph 53, Zandman discloses a conductive polymer conductor made of a thermoplastic or a thermosetting material. Moreover, it would have been obvious to combine this disclosure of Zandman with the disclosure of Zafrany because it would facilitate provision of the conductive polymer conductor of Zafrany.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany and Zandman as applied to claim 29, and further in combination with Chang (20030232174).

Chang is applied for the same reason it is applied to claim 28.

Claims 33, 34, 41, 44 and 48-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany and Zandman as applied to claims 29 and 35, and further in combination with Neuhaus (6853087).

Zafrany and Zandman does not appear to explicitly disclose attaching a conductive medium to a the first conductor, attaching the conductive medium to a second conductor included with the large-scale component to interconnect the integrated circuit to the large-scale component; using one of thermosonic bonding and thermocompression bonding to facilitate the attaching of the conductive medium to any one of the first conductor and the second conductor; disposing a conductive medium on the first conductor to interconnect the first conductor to the second conductor of the large-scale component; wherein the conductive medium is any one of a polymer carrier having conductive particles, an inherently conductive thermoplastic material, a thermoplastic material having conductive particles, an inherently conductive thermosetting material, a thermosetting material having conductive particles, a conductive polymer, a carbon-based conductor, a carrier having conductive fibers, a carrier having conductive carbon

nanotubes, a pressure sensitive adhesive having conductive fillers, and a solder; disposing a non-conductive adhesive between the first conductor and the second conductor and either selectively rupturing a predetermined portion of the non-conductive adhesive to allow for contact between the first conductor and the second conductor, or bringing the first conductor and the second conductor sufficiently close to enable capacitive coupling of the two conductors through the non-conductive material; wherein crimping or pressing is used to rupture the predetermined portion of the non-conductive adhesive; forming an edge-seal around the edges of the first conductor and the second conductor to hold the first conductor and the second conductor in intimate contact; dispensing a plurality of small and sharp particles in one of the first conductor or the second conductor, the particles to create a mechanical interlock between the first conductor and the second conductor when the first conductor and the second conductor are placed in immediate contact with one another; wherein at least one of the first conductor and the second conductor is made of a thermosetting or a thermoplastic material; wherein the particles are coated with a conductive material; forming an edge-seal around the edges of the first conductor and the second conductor; dispensing a plurality of small and sharp particles in one of the first conductor and the second conductor to enhance contact to the first conductor or the second conductor; forming a conductive medium on the

first conductor to interconnect the first conductor to the second conductor and dispensing a plurality of small and sharp particles in the conductive medium.

Notwithstanding, as cited *supra*, Neuhaus discloses attaching a conductive medium 1114 to a the first conductor 1104, attaching the conductive medium to a second conductor 1128a included with the large-scale component 1128 to interconnect the integrated circuit 1100 to the large-scale component; using one of thermosonic bonding and thermocompression bonding to facilitate the attaching of the conductive medium to any one of the first conductor and the second conductor; disposing a conductive medium on the first conductor to interconnect the first conductor to the second conductor of the large-scale component; wherein, inherently, the conductive medium is any one of an isotropic material and an anisotropic material; wherein the conductive medium is a carbon-based "diamond" conductor; disposing a non-conductive adhesive 1124 between the first conductor and the second conductor and either selectively rupturing a predetermined portion of the non-conductive adhesive to allow for contact between the first conductor and the second conductor, or bringing the first conductor and the second conductor sufficiently close to enable capacitive coupling of the two conductors through the non-conductive material; wherein crimping or pressing is used to rupture the predetermined

portion of the non-conductive adhesive; forming an edge-seal around the edges of the first conductor and the second conductor to hold the first conductor and the second conductor in intimate contact; dispensing a plurality of small and sharp particles 1114 in one of the first conductor or the second conductor, the particles to create a mechanical interlock between the first conductor and the second conductor when the first conductor and the second conductor are placed in immediate contact with one another; wherein the particles are coated with a conductive material; forming an edge-seal 1124 around the edges of the first conductor and the second conductor; dispensing a plurality of small and sharp particles in one of the first conductor and the second conductor to enhance contact to the first conductor or the second conductor; forming a conductive medium 1116 on the first conductor to interconnect the first conductor to the second conductor and dispensing a plurality of small and sharp particles 1114 in the conductive medium. Furthermore, it would have been obvious to combine this disclosure of Neuhaus with the disclosure of Zafrany and Zandman because it would facilitate coupling between the conductor and component.

Claims 35 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karpman (6448109) and Chang (5707902).

At column 2, line 63 to column 5, line 15, Karpman discloses a method comprising: embedding an integrated circuit 6 into a first substrate 2 and

disposing a first conductor "bump" on the first substrate, the integrated circuit electrically connected to the first conductor, the first conductor being made of a material; and electrically coupling a large-scale component "MEMS" having a second conductor 32 to the integrated circuit, the second conductor being electrically coupled to the first conductor to electrically couple the large-scale component to the integrated circuit, the large-scale component including a second substrate 12.

However, Karpman does not appear to explicitly disclose the first conductor being made of a thermosetting material or a thermoplastic material; disposing a conductive medium on the first conductor to interconnect the first conductor to the second conductor of the large-scale component.

Regardless, at column 7, lines 5-20, Chang discloses the first conductor "composite bump" inherently being made of a thermosetting material or a thermoplastic material; disposing a conductive medium 52 on the first conductor to interconnect the first conductor to the second conductor of the component "substrate." In addition, it would have been obvious to combine this disclosure of Chang with the disclosure of Karpman because it would result in extremely reliable physical and electrical connections between the integrated circuit element and substrate.

Applicant's amendment and remarks filed 2-6-6 have been fully considered, are addressed by the rejections *supra*, and are further addressed *infra*.

Applicant traverses the drawing objection and the related 35 U.S.C. 112, first paragraph, rejection of claim 57, and cites specific portions of the original disclosure as allegedly illustrating the elements of and enabling claim 57.

This traversal is respectfully deemed unpersuasive because the cites are not directed to the elements of claim 57, and they do not otherwise enable claim 57.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

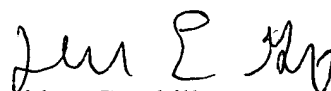
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Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.
The fax phone number for group 2800 is (571) 273-8300.



David E. Graybill
Primary Examiner
Art Unit 2822

D.G.
28-Apr-06